

Applicant: Juha Lipponen et al.
PCT App. No.: PCT/FI2003/000745

Claim Listing

1–16. (cancelled)

17. (new) A method for controlling the curl of a web of paper or paperboard, the method comprising the steps of:

forming a base web having a first side and a second side in a papermaking machine having a press section and a dryer section, the dryer section having a first dryer cylinder group;

drying the base web on the press section of the papermaking machine;

drying the base web further on the dryer section of the papermaking machine;

setting a base web speed differential, or draw, between the press section and the first dryer cylinder group of the dryer section of less than or equal to 3 percent;

applying a first side size furnish composed of liquid and dry size solids to the first side of the base web, wherein the first surface size furnish has a first ratio of dry size solids to dry size solids plus liquid, of at least 15 percent; and

applying a second side size furnish composed of liquid and dry solids to the second side of the base web, wherein the second side furnish has a second ratio of dry solids to dry solids plus liquid which is different than the first ratio, so as to control curl in the base web after applying said size furnishes to the first and second sides.

18. (new) The method of claim 17, wherein the step of applying a first side size furnish composed of liquid and dry size solids to the first side of the base web, comprises applying the first side size furnish at a first rate, and wherein the step of applying a second side size furnish composed of liquid and dry solids to the second side of the base web, comprises applying the second side size furnish at a second rate, and wherein the first rate is equal to the second rate.

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19. (new) The method of claim 17, wherein the step of applying a first side size furnish composed of liquid and dry size solids to the first side of the base web, comprises applying the first side size furnish at a first rate, and wherein the step of applying a second side size furnish composed of liquid and dry solids to the second side of the base web, comprises applying the second side size furnish at a second rate, and wherein the first rate is different from the second rate, and wherein the rate of liquid imported to the first side in the first side size furnish is equal to the rate of liquid imported to the second side in the second side size furnish.

20. (new) The method of claim 17 wherein the first ratio is at least 20 percent.

21. (new) The method of claim 17, wherein the first ratio is at least 25 percent.

22. (new) The method of claim 17, wherein the base web speed differential, or draw, between the press section and the first dryer cylinder group of the dryer section is 1 percent to 2 percent.

23. (new) The method of claim 17, wherein a brightener is added to one of the first side size furnish and the second side size furnish.

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24. (new) A method for forming a web with reduced curl comprising the steps of: forming a base web having a first side and a second side in a papermaking machine having a press section and a dryer section, the dryer section having a first dryer cylinder group; drying the base web on the press section of the papermaking machine; drying the base web further on the dryer section of the papermaking machine; setting a base web speed differential, or draw, between the press section and the first dryer cylinder group of the dryer section of 1 percent to 2 percent; after the dryer section applying a first side size furnish composed of water and dry solids to the first side of the base web, the first side size furnish having a first ratio of dry solids to dry size solids plus water of at least 15 percent; applying a second side size furnish composed of water and dry solids to the second side of the base web, the second side size furnish having a second ratio of dry solids to dry solids and water of between 8 percent to 30 percent, the second ratio being different from the first ratio; and selecting the first ratio, a first side size furnish application rate, the second ratio, and a second side size furnish application rate, so that a selected amount of dry solids is applied to each unit area of the first side, and a selected amount of dry solids is applied to each unit area of the second side, and an amount of water applied to a unit area of the first side in the first side size furnish and to a unit area of the second side in the second side size furnish is selected to thereby control the tendency of the web to curl after drying.

25. (new) The method of claim 24, wherein the selected amount of dry solids applied to the unit area of the first side, and the selected amount of dry solids applied to the unit area of the second side are the same.

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26. (new) The method of claim 17, wherein the step of applying a first side size furnish composed of water and dry size solids to the first side of the base web, comprises applying the first side size furnish at a first rate, and wherein the step of applying a second side size furnish composed of water and dry solids to the second side of the base web, comprises applying the second side size furnish at a second rate, and wherein the first rate is different from the second rate, and wherein a rate of water imported to the first side in the first side size furnish is equal to a rate of water imported to the second side in the second side size furnish.